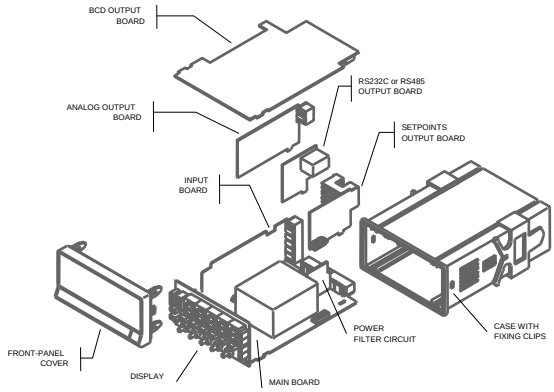
ALPHA-T

TEMPERATURE

DESCRIPTION

The ALPHA-T model, version firmware 2.00 is an instrument for temperature measurement in ºC or ºF.
Keyboard selection of the input type enables direct connection to several types of transducers such as Pt100 (3 or 4 wires), Pt1000 (2 wires) or thermocouple J, K, T, R, S, or E.
Display reading in Celsius or Fahrenheit scale, resolution of degrees, tenths of degree or hundredth of degree (only Pt100 4 wires) and programmable offset temperature from -99 to +99 counts of display, allows the meter be adapted to fit desired application.
In addition, 19 logical remote functions and a 10 levels filter provide stable reading in almost any process type.
Sensor Break detection.

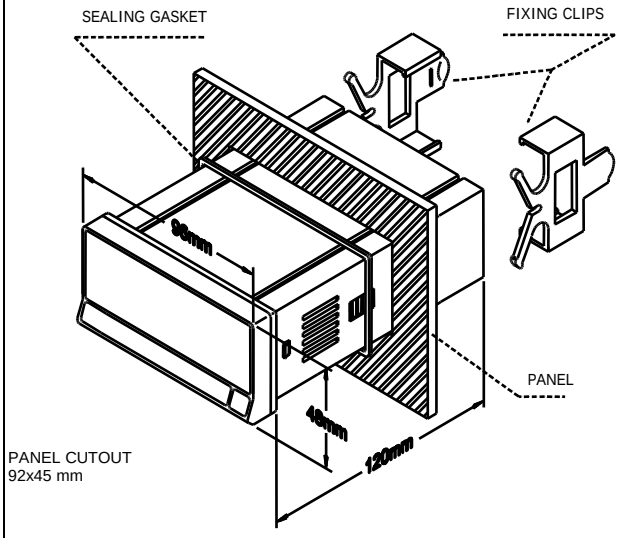
STRUCTURE



STANDARD

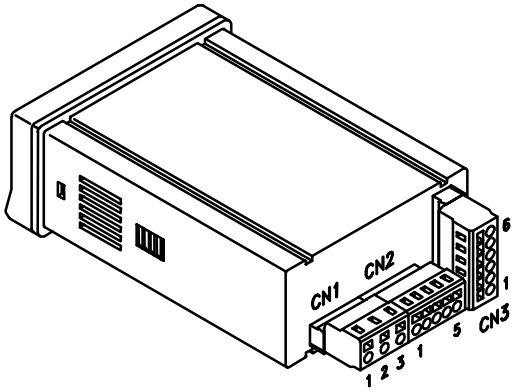
- Panel-mounting 1/8 DIN case, depth 120 mm
- Electronics assembly:
  - Main board with supply power filtering card.
  - Input card specific for RTD Pt100 and thermocouple inputs.
  - Display and keyboard module.
- Single-part clips for panel mounting.
- Front panel sealing gasket.
- Plug-in terminal block connectors.

DIMENSIONS AND MOUNTING



PANEL CUTOUT
92x45 mm

CONNECTIONS



CN1	POWER SUPPLY	
PIN	AC VERSION	DC VERSION
1	AC PHASE	DC POSITIVE
2	GND (GROUND)	-
3	AC NEUTRAL	DC NEGATIVE

CN2	REMOTE FUNCTIONS
1	PEAK
2	VALLEY
3	COMMON
4	RESET PEAK / VALLEY
5	HOLD 2

CN3	INPUT SIGNAL			
PIN	**Pt100 3 wires**	**(*) Pt100 4 wires**	**Pt1000 2 wires**	**TC**
1	Pt100	Pt100 End A	Pt1000	+ TC
2	-			
3	Pt100	Pt100 End B	Pt1000	- TC
4	-	P1oo End B		
5	Pt100 common	P100 End A		
6				
		(*) See mnual		

ALPHA-T

OPTIONS

The ALPHA-T model can accept a variety of output options which are installed in the meter's main assembly by means of plug-in connectors:

• 2 SPDT Relays rating 8A @ 250V AC / 150V DC
Ref..... **2RE**

• 4 SPST Relays rating 5A @ 250V AC / 50V DC
Ref..... **4RE**

• 4 NPN Outputs rating 50mA @ max.50V DC
Ref..... **4OP**

• 4 PNP Outputs rating 50mA @ max.50V DC
Ref..... **4OPP**

The setpoints are independently programmable for HI or LO action and time delay or hysteresis operation. They can also be made to track one another by a programmable or automatic offset.

• RS232C communication output, 1200 to 19200 baud
Ref..... **RS2**

• RS485 communication output, 1200 to 19200 baud
Ref..... **RS4**

Serial communication protocols: standard, ISO1745, Modbus

• Isolated analog output 0-10V / 4-20mA
Ref..... **ANA**

The analog outputs can be used to drive remote displays or for proportional control purposes.

• BCD parallel outputs with TTL/ 24V DC logic
Ref..... **BCD**

STANDARD FUNCTIONS

PEAK & VALLEY

The instrument detects and memorizes the max and min values reached for the variable after the last reset (peak and valley).
To display the peak value, press the MAX/MIN key. The second push calls up the valley value. The third push makes the display show the tare value.
A falling edge at the corresponding logic inputs of the CN2 connector causes the same effects.

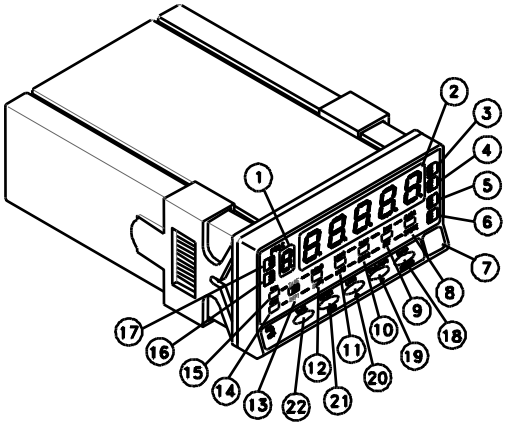
··· RESET PEAK & VALLEY MEMORY

The peak and valley memories can be reset back to their default values by simultaneously pressing the RESET and MAX/MIN keys.
The same function is available at the CN2 connector.

HOLD

The hold function is only accessible from the CN2 connector.
The hold condition (display frozen) is maintained as long as the corresponding logic input is kept at "0" level.

FRONT-PANEL FUNCTIONS



MODE		RUN	PROG
Auxiliary Display	1	-	Displays programming
Main Display	2	Displays the input variable	Displays programming
LED 1	3	Relay1 / Opto1 status	-
LED2	4	Relay2 / Opto2 status	-
LED 3	5	Relay3 / Opto3 status	-
LED 4	6	Relay4 / Opto4 status	-
Label	7	Measurement unit	
LED DATA	8	-	Indicates data memory storage
LED MIN	9	Indicates display of a valley value	Indicates input filtering
LED MAX	10	Indicates display of a peak value	-
LED LIMIT	11	Indicates display of setpoint value	-
LED HOLD	12	Indicates display hold	Indicates programming of
LED TARE	13	Indicates tare memory	Indicates programming of
LED PROG	14	-	Indicates programming
LED RUN	15	Indicates run mode	-
LED B	16	-	Indicates program step
LED A	17	-	Indicates program step
ENTER key	18	Enters in PROG mode. Displays data	Accepts data. Advances
MAX/MIN key	19	Calls up peak and valley values	Moves to right
LIMIT key	20	Calls up the setpoint values	Increments the value of the
RESET key	21	Reset the display to offset	ESCAPE function
TARE key	22	-	-

Remote functions (CN2)

The rear connector CN2 provides 4 user programmable optocoupled inputs that can be operated from external contacts or logic levels supplied by an electronic system. Four different functions may be then added to the functions available from the front-panel keys. Each function is associated to one of the CN2 connector pins (PIN 1, PIN 2, PIN 4 and PIN 5) and is activated by applying a falling edge or a low level pulse to the corresponding pin with respect to common (PIN 3). Each pin can be assigned one of the 19 functions listed on the following pages.

DISPLAY / MEMORY FUNCTIONS

Nº	Function	Description	Activation
0	None	Deactivated. The pin has no function	None
3	PEAK	Recalls peak value. A new falling edge returns to normal reading	Falling edge
4	VALLEY	Recalls valley value. A new falling edge returns to normal reading	Falling edge
5	RESET PEAK/ VALLEY	Clears the peak or valley memory (if the values are on display)	Falling edge
6	PEAK/ VALLEY	1st push recalls peak, 2nd push recalls valley. Last push returns to the normal reading.	Falling edge
7	RESET	In combination with (6) clears peak or valley memories	Falling edge combined with (6)
8	HOLD1	Holds the display while the outputs remain active	Low level
9	HOLD2	Holds the display, the BCD and the analog outputs	Low level
10	INPUT	Shows the input value in mV or ohms	Low level

FUNCTIONS ASSOCIATED WITH THE ANALOG OUTPUT

14	ZERO ANA	Puts the analog output to the zero state (0 V for 0-10 V, 4 mA for 4-20 mA)	Low level
15	ANA PEAK	Makes the analog output follow the peak value	Low level
16	ANA VALLEY	Makes the analog output follow the valley value	Low level

FUNCTIONS FOR USE WITH A PRINTER VIA THE RS OUTPUTS

17	PRINT NET	Prints the temperature and units.	Falling edge
20	PRINT SET1	Prints the setpoint1 value and its output status.	Falling edge
21	PRINT SET2	Prints the setpoint2 value and its output status.	Falling edge
22	PRINT SET3	Prints the setpoint3 value and its output status.	Falling edge
23	PRINT SET4	Prints the setpoint4 value and its output status.	Falling edge

FUNCTIONS ASSOCIATED WITH THE SETPOINTS AND RS OUTPUTS

24	FALSE SETPOINTS	Exclusively for instruments WITHOUT relays/transistors control outputs card. Allows programming and operation of 4 setpoints without physical output.	Low level
25	RESET SETPOINTS	Exclusively for instruments with 1 or more setpoints programmed as "latched setpoints". Resets the latched setpoints.	Falling edge

SPECIAL FUNCTIONS

28	SEND ASCII	Transmits the four last digits of the display to a remote ASCII indicator. By holding the input to a low level, transmission takes place every second.	Falling edge / Low level
29	Deactivate Setpoints	Deactivates the activity of the setpoints and leaves the output at still.	

ALPHA-T

INPUT SIGNAL

- Configuration ..... differential asymmetrical
- Cold junction compensation..... -10 ºC to +60 ºC
- Pt100 excitation current ..... < 1 mA DC
- Max. cable resistance..... 40 Ω/ cable (balanced)

ACCURACY

- Max. error ..... see table 1
- Cold junction coefficient..... ±(0.05 ºC/ ºC +0.1 ºC)
- Temperature coefficient (except Pt100 4 wires) .... 200ppm/ ºC
- Warm-up ..... 15 minutes

Table 1

Input	Range (0.1 °)	Resolution (0.1°)	Range (1°)	Resolution (1°)
TC J	-200.0 to +1100.0 ºC	0.4% L ±0.6 ºC	-200 to +1100 ºC	0.4% L ±1 º C
	-328.0 to +2012.0 ºF	0.4% L ±1 ºF	-328 to +1472 ºF	0.4% L ±2 º F
TC K	-200.0 to +1200.0 ºC	0.4% L ±0.6 ºC	-200 to +1200 ºC	0.4% L ±1 º C
	-328.0 to +2192.0 ºF	0.4% L ±1 ºF	-328 to +2192 ºF	0.4% L ±2 º F
TC T	-150.0 to +400.0 ºC	0.4% L ±0.6 ºC	-150 to +400 ºC	0.4% L ±1 º C
	-302.0 to +752.0 ºF	0.4% L ±1 ºF	-302 to +752 ºF	0.4% L ±2 º F
TC R	-50.0 to 1700.0 ºC	0.5% L ±2 ºC	-50 to 1700 ºC	0.5% L ±4 º C
	-58.0 to +3092.0 ºF	0.5% L ±4 ºF	-58 to +3092 ºF	0.5% L ±7 º F
TC S	-50,0 to 1700,0 ºC	0.5% L ±2 ºC	-50 to 1700 ºC	0.5% L ±4 º C
	-58.0 to +3092.0 ºF	0.5% L ±4 ºF	-58 to +3092 ºF	0.5% L ±7 º F
TC E	-200.0 to 1000.0 ºC	0.4% L ±1 ºC	-200 to 1000 ºC	0.4% L ±2 ºC
	-328.0 to +1832.0 ºF	0.4% L ±2 ºF	-328 to +1832 ºF	0.4% L ±4 ºF
Pt100 Pt1000	-100.0 to +800.0 ºC	0.2% L ±0.6 ºC	-100 to +800 ºC	0.2% L ±1 ºC
	-148.0 to +1472.0 ºF	0.2% L ±1 ºF	-148 to +1472 ºF	0.2% L ±2 ºF

Pt100 4 wires	Resolution	0.01ºC/ 0.01ºF
	Measure range	0.00 to 70.00 ºC /32.00 to 158.00 ºF
	Accuracy @ 25 ºC± 2ºC	0.2 % L ± 0.05 ºC
	Thermal drift	0.02 ºC / ºC
	Operating temperature	10ºC to 40 ºC

Note: Using Pt1000 sensor 2 wires have to be taken into account that each 0,385 ohms of wires resistance produce an error of 0,1 ºC

FILTERS

Filter P

- Cut-off frequency ..... from 4Hz to 0.05Hz
- Slope..... from 14 to 37dB/10

A/D CONVERSION

- Technique ..... Sigma-delta
- Resolution ..... 24 bit
- Conversion rate..... 18/s

DISPLAY

- Main..... 5 digits 14mm red
- Auxiliary ..... 1 digit 7.6mm green
- Decimal point..... fixed
- LED's..... 14 (programming and control)
- Display update time 55.5ms
- Positive over range..... +oVFLo
- Negative over range..... -oVFLo
- Sensor Break ..... "-----"

ENVIRONMENTAL

- Operating temp..... -10 ºC to 60 ºC
- Storage temperature ..... -25 ºC to +85 ºC
- Relative humidity ..... <95 % at 40 ºC
- Max. altitude..... 2000 meters

MECHANICAL

- Dimensions..... 96x48x120 mm
- Panel cut out ..... 92x45 mm
- Weight ..... 600 g
- Case material..... UL 94 V-0 rated polycarbonate
- Front Sealed ..... IP65 (Indoor use)

POWER SUPPLY

- AC voltages..... 115/230V 50/60Hz (±10%)
  ..... 24/48V 50/60Hz (±10%)
- DC voltages ..... 10-30V DC
- Consumption..... 5W without options, 10W max

FUSES (DIN 41661) (Recommended)

- Alpha-T (230/115V AC)..... F 0.2A/ 250V
- Alpha-T1 (10-30V DC) ..... F 2A/ 250V
  Alpha-T2 (24/48V AC)..... F 0.5A/ 250V

ORDERING REFERENCES

- 115/230V AC 50/60Hz powered..... ALPHA-T
- 10-30V DC powered ALPHA-T1
- 24/48V AC 50/60Hz powered ALPHA-T2